41-N

Guilford County Department of Public Health

Guilford County Environmental Health
Suite 401
1100 E. Wendover Ave.
Greensboro, NC 27405

FAX Number (336) 373-4812

FAX TRANSMITTAL FORM

DATE: 10/26/99

NAME: Phillip Prete

FIRM:

CITY: Raleigh, NC

FAX NUMBER: () 919-733-4810

Health Consultation 9/10/99

FROM: Eric J. Ireland

TELEPHONE: (336) 373-3771 voice mail->

NUMBER OF PAGES: 4 plus cover

SCANNED 6/20/14

PLEASE CALL AS SOON AS POSSIBLE IF YOU DID NOT RECEIVE ALL OF THE PAGES

~~PROJECT NAME~~:

LOCATION:

Fwd Attached info forwarded to Dr. Williams after his initial report. A copy of his initial report is included.

DESCRIPTION:

COMMENTS:

Guilford County
Department of Public Health

Guilford County Environmental Health
Suite 401
1100 E. Wendover Ave.
Greensboro, NC 27405

FAX Number (336) 373-4812

336-574-3540
336-333-6626 Phones
336-373-3771

FAX TRANSMITTAL FORM

DATE: 10/18/99

NAME: Dr. Robert Williams

FIRM: ATSDR

CITY: Atlanta, Georgia

FAX NUMBER:() 404-639-0655

FROM: Eric J. Ireland, R.S.

TELEPHONE: (336) 373-3771 voice mail->

NUMBER OF PAGES: 33. plus cover

PLEASE CALL AS SOON AS POSSIBLE IF YOU DID NOT RECEIVE ALL OF THE PAGES

~~PROJECT NAME:~~

LOCATION: Dr. Williams, here is the follow-up information on the Wiley-Davis Landfill Investigation per Ken Carter, R.S.

DESCRIPTION:

COMMENTS: Please contact Ken Carter, or Eric Ireland when you've had a chance to Review this information. Thank You for Your Help.

41-N

Health Consultation

WILEY DAVIS LANDFILL

GREENSBORO, NORTH CAROLINA

SEPTEMBER 10, 1999

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at
1-888-42ATSDR
or
Visit our Home Page at: http://atsdr1.atsdr.cdc.gov:8080/

HEALTH CONSULTATION

WILEY DAVIS LANDFILL

GREENSBORO, NORTH CAROLINA

Prepared by:

Exposure Investigation and Consultation Branch
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry

Background and Statement of Issues

A private citizen requested the Agency for Toxic Substances and Disease Registry (ATSDR) to review the results of groundwater samples obtained from several residential wells and monitoring wells and comment on the health implications associated with exposure to the contaminants reported.

Wiley Davis Landfill is an active landfill located at 4104 Wiley Davis Road in Greensboro, North Carolina. It is situated on 18.1 acres. The site was mined for sand rock from the1950s until 1969. Sometime after 1969, a roofing company used this site to dump roofing materials [1]. Also it was open to anyone who used it for a dump. On May 8, 1980, the site was permitted as a demolition landscape landfill. On April 17, 1990, the state of North Carolina recommended that the landfill be closed by September 15, 1999 [1].

During March and April 1999, the North Carolina Department of Health and Human Services (NCDHHS) collected groundwater samples from 26 residential wells near Wiley Davis Landfill. On May 3, 1999, the NCDHHS collected groundwater samples from six monitoring wells that are located around the landfill. All samples were analyzed for volatile organic compounds (VOCs) and metals. There was no information provided to indicate the groundwater flow direction, nor was any information provided to indicate where the residential groundwater samples were collected from, or the depth of the wells. Table 1 shows the results of 10 residential wells sampled and the maximum concentrations of contaminants detected in the groundwater samples. The results of the other 16 residential wells sampled showed that no contaminants were present, or the contaminants detected were at very low levels which did not exceed any health based comparison values (see attachment 1 for residential identifications). The monitoring wells groundwater sampling results showed that iron ranged from 4,510 micrograms/liter (µg/l) to 22,227 µg/l, and tetrahydrofuran ranged from 16.3 µg/l to 214.5 µg/l.

Table 1.

Maximum Levels of Contaminants Detected in Residential Groundwater Samples

Residence	2-Butanone	Copper	DBC	Lead	Iron	THF	Mn
1					450		
2					380		
3				34	8,560		
4					4,520		150
5					670		
6					900		
7		1,780		115	58,900		510
8					10,200		
9					550		
10	803.3		2			2,394	
CV/RAL		**1,000*****		**15***	**300*****		**50****

All values are expressed as micrograms/liter (µg/l).
DBC = Dibromochloropropane
THF = Tetrahydrofuran
Mn = Manganese
*RAL = Removal Action Level
**CV = Comparison Value
*** SMCL = Secondary Maximum Contaminant Level

Discussion

The results of groundwater sampling conducted at 26 residential wells indicate that lead was detected in a groundwater sample from one well at 115 µg/l, and from another residential well at 34 µg/l. Lead was not reported in any other groundwater samples at levels which exceeded the U.S. Environmental Protection Agency's (EPA) Removal Action Level (RAL) of 15µg/l.
Iron and copper were detected in groundwater samples from residential wells at levels that exceeded EPA's Secondary Maximum Contaminant Levels (SMCL) of 300 µg/l, and 1000 µg/l, respectively. Also, manganese was detected in a residential groundwater sample at 510 µg/l, which exceeded ATSDR's comparison value of 50 µg/l.

The RALs are drinking water concentrations of contaminants that are considered, along with other factors, in determining whether to provide alternate water supplies under Superfund removal authority. An SMCL is an unenforceable federal guideline regarding taste, odor, color and certain other non-aesthetic effects of drinking water. EPA recommends SMCLs to the States as reasonable goals, but federal law does not require water systems to comply with them, because they are not health based derived comparison values. Comparison values are considered to be safe under default conditions of exposure, and are used as screening values in the preliminary identification of site-specific contaminants of concern.

Exposure to lead may cause serious adverse health effects, particularly in fetuses and young children. Factors influencing this susceptibility include;(1) the immaturity of the blood brain barrier; (2) nutritional status of the child; (3) low body weight; and (4) passive diffusion of contaminants across the placenta to the developing fetus. Prenatal lead exposure is associated with premature delivery, decreased birth weight, impaired postnatal neurobehavioral development, and decreased postnatal growth rate [2]. Because of these factors, children are more at risk of developing adverse health effects than adolescents and adults.

Toxicity of a chemical depends on the dose, and although iron, copper and manganese are essential metals for humans, which are involved in many enzymes activities, sometimes acute or chronic overload may occur due to excessive levels of these chemicals in drinking water. Clinical signs of toxicity to iron overload include nausea, vomiting, severe gastroenteritis (inflammation of stomach and intestine), abdominal (stomach) pain, diarrhea, and lethargy (abnormal drowsiness) [3]. Currently, there are no federal drinking water standards for iron that are enforceable, but the state of North Carolina uses 300 µg/l as a reasonable goal. Prolonged exposure to copper has been linked to liver failure, renal (kidney) failure, and hemolysis (breakdown of the red blood cell) in adults and children [3]. Although humans are often exposed to significant quantities of manganese in food and water, reports of adverse effects in humans from ingestion of manganese are rare [4]. Because these chemical levels reported in groundwater samples from residential wells exceed their SMCLs, it would be prudent public practice to advise the residents of the potential of bad odor and unpleasant taste, and the potential of adverse health effects. The chemical 2-butanone was detected in residential drinking water at 803 µg/l which is below ATSDR's Reference Dose Media Evaluation Guide (RMEG) of 2,000 µg/l. An RMEG is an estimate of the daily exposure that is likely to be without a significant risk of non-cancerous adverse health effects over a lifetime.

The results of groundwater samples obtained from six monitoring wells indicate that tetrahydrofuran and iron were detected at elevated levels. Tetrahydrofuran was also detected in a residential groundwater sample at 2,394 µg/l. Tetrahydrofuran is a liquid with an ether like order which is used as a solvent for high polymers such as polyvinyl chloride [4].

Conclusions

Lead levels detected in groundwater samples from residences 3 and 7, pose health hazard to those persons (including children) who consume this water on a daily basis. In addition, tetrahydrofuran detected in groundwater from residence 10 poses a public health hazard to those persons (including children) who consume the water on a daily basis. Iron, copper and 2- butanone do not pose health hazard to those persons who consume the groundwater on a daily basis.

Recommendations

1. Provide alternate water for residences 3, 7 and 10. If re-sampling shows that the lead levels are still elevated in groundwater at residences 3 and 7, consider performing a blood lead screening test in children who live at these residences.

2. Monitor the residential wells on a quarterly basis until the source has been remediated.

Robert L. Williams

Robert L. Williams, Ph.D.

References

1. Data Package for Wiley Davis Landfill Site, Greensboro, NC, June 11, 1999, submitted by Nancy Lenker, to Bob Safay (ATSDR's Region IV Representative).

2. Toxicological Profile for Lead, U.S. Public Health Service, ATSDR, Atlanta, Ga. February 17, 1998.

3 Mineral and Metal Neurotoxicology, edited by Masayuki Yasui et.al.,CRC Press, Inc., 1997.

4. The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Published by Merck and Company, Incorporation, Rahway, NJ, 1989.

Attachment 1

WILEY DAVIS LANDFILL	
RESIDENCE NUMBER	RESIDENCE LAB ID#
1	991614
2	991008
3	991020
4	991194
5	991192
6	991615
7	991023
8	991332
9	991189
10	991557

Residential Well #7

RESEARCH & ANALYTICAL LABORATORIES, INC.

Analytical/Process Consultations

RESEARCH & ANALYTICAL LABS. SIDNEY L. CHAMPION NC #37701 DIRECTOR CERTIFIED ANALYSIS

Chemical Analysis for Selected Parameters and Sampling Location Identified as 4010 Sedgewood Lane (A Nancy Lenker Project, 30 April 1999)

Drinking Water Code	Volatile Organic Chemicals (VOCs) Parameter	Detection Limits (mg/L)	Results (mg/L)	Allowable Limits (mg/L)	Regulatory Status (R/U)
2030	p-Isopropyltoluene	0.0005	BDL	N/A	U
2210	Chloromethane	0.0005	BDL	N/A	U
2212	Dichlorodifluoromethane	0.0005	BDL	N/A	U
2214	Bromomethane	0.0005	BDL	N/A	U
2216	Chloroethane	0.0005	BDL	N/A	U
2218	Fluorotrichloromethane	0.0005	BDL	N/A	U
2246	Hexachlorobutadiene	0.0005	BDL	N/A	U
2248	Naphthalene	0.0005	BDL	0.07	R
2378	1,2,4-Trichlorobenzene	0.0005	BDL	0.07	R
2380	Cis-1,2-Dichloroethylene	0.0005	BDL	N/A	U
2408	Dibromomethane	0.0005	BDL	N/A	U
2410	1,1-Dichloropropene	0.0005	BDL	N/A	U
2412	1,3-Dichloropropene	0.0005	BDL	N/A	U
2413	1,3-Dichloropropane	0.0005	BDL	N/A	U
2414	1,2,3-Trichloropropane	0.0005	BDL	N/A	U
2416	2,2-Dichloropropane	0.0005	BDL	N/A	U
2418	1,2,4-Trimethylbenzene	0.0005	BDL	N/A	U
2420	1,2,3-Trichlorobenzene	0.0005	BDL	N/A	U
2422	n-Butylbenzene	0.0005	BDL	N/A	U
2424	1,3,5-Trimethylbenzene	0.0005	BDL	N/A	U
2428	Tert-Butylbenzene	0.0005	BDL	N/A	U
2428	Sec-Butylbenzene	0.0005	BDL	N/A	U
2430	Bromochloromethane	0.0005	BDL	N/A	U
2941	Chloroform	0.0005	BDL	N/A	U
2942	Bromoform	0.0005	BDL	N/A	U
2943	Bromodichloromethane	0.0005	BDL	N/A	U
2944	Chlorodibromomethane	0.0005	BDL	10	R
2955	Xylenes (Total)	0.0005	BDL	0.005	R
2964	Dichloromethane	0.0005	BDL	N/A	U
2965	o-Chlorotoluene	0.0005	BDL	N/A	U
2966	p-Chlorotoluene	0.0005	BDL	N/A	U
2967	m-Dichlorobenzene	0.0005	BDL	0.6	R
2968	o-Dichlorobenzene	0.0005	BDL	0.075	R
2969	p-Dichlorobenzene	0.0005	BDL	0.002	R
2976	Vinyl Chloride	0.0005	BDL	0.007	R
2977	1,1-Dichloroethylene	0.0005	BDL	N/A	U
2978	1,1-Dichloroethane	0.0005	BDL	0.1	R
2979	Trans-1,2-Dichloroethylene	0.0005	BDL	0.005	R
2980	1,2-Dichloroethane	0.0005	BDL	0.2	R
2981	1,1,1-Trichloroethane	0.0005	BDL	0.005	R
2982	Carbon Tetrachloride	0.0005	BDL	0.005	R
2983	1,2-Dichloropropane	0.0005	BDL	0.005	R
2984	Trichloroethylene	0.0005	BDL	0.005	R
2985	1,1,2-Trichloroethane	0.0005	BDL	N/A	U
2986	1,1,1,2-Tetrachloroethane	0.0005	BDL	0.005	R
2987	Tetrachloroethylene	0.0005	BDL	N/A	U
2988	1,1,2,2-Tetrachloroethane	0.0005	BDL	0.1	R
2989	Chlorobenzene	0.0005	BDL	0.005	R
2990	Benzene	0.0005	BDL	1.0	R
2991	Toluene	0.0005	BDL	0.7	R
2992	Ethylbenzene	0.0005	BDL	N/A	U
2993	Bromobenzene	0.0005	BDL	N/A	U
2994	Isopropylbenzene	0.0005	BDL	0.1	R
2996	Styrene	0.0005	BDL	N/A	U
2998	n-Propylbenzene	0.0005	BDL	N/A	U
	Inorganics				
1010	Barium	0.040	0.121	2.000	
1020	Chromium	0.010	BDL	0.100	
1022	Copper	0.010	0.105	1.30	
1028	Iron	0.050	0.078	0.300	
1030	Lead	0.005	BDL	0.015	
1032	Manganese	0.010	BDL	0.050	
1915	Total Hardness	1.0	76.5	—	
1925	pH, standard units	—	6.13	> 6.5	
	Sample Number		359839		
	Sample Date		04/30/99		
	Sample Time		0725		

Drinking Water Code, Allowable Limits, & Regulatory Status via NC PWSS (North Carolina Public Water Supply Section - Division of Environmental Health)

BDL = Below Detection Limits N/A = Not Allowed U = Unregulated R = Regulated mg/L = Milligrams Per Liter = Parts Per Million (PPM)

For L:\WORK\REPORTS\2010\LENKER.DOC

Residential Well #7

North Carolina State Laboratory of Public Health
Department of Health and Human Services
P. O. Box 28047 -- 306 N. Wilmington St. -- Raleigh, N. C. 27611-8047

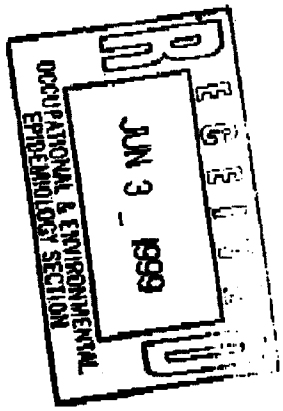
INORGANIC CHEMICAL ANALYSIS - PRIVATE WATER SYSTEM

Name of System: LINKER
Address: 4010 SLEDGEWOOD LN. GREENSBORO. NC **Zip:**
County: GUILFORD
Report To: Guilford Co. Health Dept. Post Office Box 3508 Greensboro, NC 27402-3508 **ATTN:** GARRIS EVANS (336) 373-7613
Courier: 02-15-32

Source of Water:
Source of Sample:
Type of Sample:
Type of Treatment:
Type of Analysis PRIVATE

Collected By: PGE **Date:** 3/29/99 **Time:** 11:15:00 AM
Location of sampling point:
Remarks: NO REPORT SHEET.

Parameters	Results	Units	Date Analyzed:
Alkalinity as CaCO3	72	mg/l	3/30/99
Arsenic	<0.01	mg/l	3/30/99
Calcium	26.4	mg/l	3/30/99
Chloride	28	mg/l	3/30/99
Copper	1.78	mg/l	3/30/99
Fluoride	<0.10	mg/l	3/30/99
Iron	58.9	mg/l	3/30/99
Hardness as CaCO3 (Ca,Mg)	178	mg/l	3/30/99
Magnesium	27.4	mg/l	3/30/99
Manganese	0.51	mg/l	3/30/99
Lead	0.115	mg/l	3/30/99
pH	6.7	Std. unit	3/30/99
Zinc	0.72	mg/l	3/30/99



All results are below established limits for drinking water except for Copper which is slightly above the 1.3 mg/l limit For drinking water, Iron is well above established drinking water limit of 0.30 mg/l and Lead which is well above the drinking water limit.

Date Received: 3/30/99 **Report Date:** 4/9/99 **Reported By:**
Today's Date: 4/9/99 **Ref:** 4549 **Sample Number:** AA13432

Residential Well #3

North Carolina State Laboratory of Public Health
Department of Health and Human Services
P. O. Box 28047 – 306 N. Wilmington St. – Raleigh, N. C. 27611-8047

INORGANIC CHEMICAL ANALYSIS - PRIVATE WATER SYSTEM

Name of System: BULLARD
Address: 4006 SHEDGEWOOD LN.
GREENSBORO, NC **Zip:**

County: GUILFORD

Report To: Guilford Co. Health Dept.
Post Office Box 3508
Greensboro, NC 27402-3508
ATTN: P.GARRIS EVAN
(336) 373-7613
Courier: 02-15-32

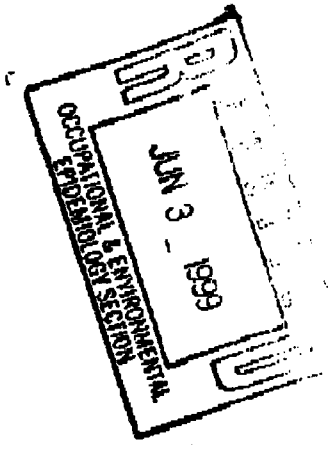
Source of Water: GROUND
Source of Sample:
Type of Sample: RAW
Type of Treatment: NONE
Type of Analysis PRIVATE

Collected By: PGE **Date:** 3/30/99 **Time:** 12:30:00 PM

Location of sampling point: FRONT HOSE BIB

Remarks: _____

Parameters	Results	Units	Date Analyzed:
Alkalinity as CaCO3	51	mg/l	3/31/99
Arsenic	<0.01	mg/l	3/31/99
Calcium	12.9	mg/l	3/31/99
Chloride	13	mg/l	3/31/99
Copper	0.31	mg/l	3/31/99
Fluoride	<0.10	mg/l	3/31/99
Iron	8.56	mg/l	3/31/99
Hardness as CaCO3 (Ca,Mg)	50	mg/l	3/31/99
Magnesium	4.3	mg/l	3/31/99
Manganese	<0.03	mg/l	3/31/99
Lead	0.034	mg/l	3/31/99
pH	6.2	Std. unit	3/31/99
Zinc	<0.05	mg/l	3/31/99



All results are below established limits for drinking water except for Iron, which is well above the drinking water limit of 0.30mg/l and Lead which is twice the drinking water limit of 0.015 mg/l. pH is also below established limit of 6.5 pH units.

Date Received: 3/31/99 **Report Date:** 4/9/99 **Reported By:**
Today's Date: 4/9/99 **Ref:** 4619 **Sample Number:** AA13486

Residential Well #3 (Sampled Immediately after Turning on Tap

North Carolina State Laboratory of Public Health
Department of Health and Human Services
P. O. Box 28047 -- 306 N. Wilmington St. -- Raleigh, N. C. 27611-8047

INORGANIC CHEMICAL ANALYSIS - PRIVATE WATER SYSTEM

Name of System: Bullard, J.M.
Address: 4006 Shedgewood Ln.
Greensboro, NC **Zip:**
County: GUILFORD
Report To: Guilford Co. Health Dept.
Post Office Box 3508
Greensboro, NC 27402-3508
Courier: 02-15-32
ATTN: Eric Ireland
(336) 373-7613

Source of Water: Ground
Source of Sample:
Type of Sample: Raw
Type of Treatment: None
Type of Analysis PRIVATE

Collected By: PGE **Date:** 6/28/99 **Time:** 2:00:00 PM
Location of sampling point: front spigot
Remarks: #1 Sample

Parameters	Results	Units	Date Analyzed:
Alkalinity as CaCO3	60	mg/l	6/29/99
Arsenic	<0.01	mg/l	6/29/99
Barium	0.1	mg/l	6/29/99
Calcium	14.3	mg/l	6/29/99
Cadmium	<0.005	mg/l	6/29/99
Chloride	13	mg/l	6/29/99
Chromium	<0.01	mg/l	6/29/99
Copper	2.71	mg/l	6/29/99
Fluoride	<0.10	mg/l	6/29/99
Iron	0.21	mg/l	6/29/99
Hardness as CaCO3 (Ca,Mg)	53	mg/l	6/29/99
Magnesium	4.1	mg/l	6/29/99
Manganese	<0.03	mg/l	6/29/99
Lead	0.006	mg/l	6/29/99
pH	6.3	Std. unit	6/29/99
Zinc	0.13	mg/l	6/29/99

Date Received: 6/29/99
Today's Date: 7/9/99
Report Date: 7/9/99
Ref: 9358
Reported By:
Sample Number: AA17682

Residential Well #3 Sampled After water ran for 5 minutes

North Carolina State Laboratory of Public Health
Department of Health and Human Services
P. O. Box 28047 -- 306 N. Wilmington St. -- Raleigh, N. C. 27611-8047

INORGANIC CHEMICAL ANALYSIS - PRIVATE WATER SYSTEM

Name of System: Bullard, J.M.
Address: 4006 Shedgewood Ln.
Greensboro, NC **Zip:**
County: GUILFORD
Report To: Guilford Co. Health Dept. **ATTN:** Eric Ireland
Post Office Box 3508 (336) 373-7613
Greensboro, NC 27402-3508
Courier: 02-15-32

Source of Water: Ground
Source of Sample:
Type of Sample:
Type of Treatment: None
Type of Analysis PRIVATE

Collected By: PGE **Date:** 6/28/99 **Time:** 2:05:00 PM
Location of sampling point: front spigot
Remarks: Sample #2

Parameters	Results	Units	Date Analyzed:
Alkalinity as CaCO3	50	mg/l	6/29/99
Arsenic	<0.01	mg/l	6/29/99
Barium	0.1	mg/l	6/29/99
Calcium	14.2	mg/l	6/29/99
Cadmium	<0.005	mg/l	6/29/99
Chloride	13	mg/l	6/29/99
Chromium	<0.01	mg/l	6/29/99
Copper	0.07	mg/l	6/29/99
Fluoride	<0.10	mg/l	6/29/99
Iron	0.37	mg/l	6/29/99
Hardness as CaCO3 (Ca,Mg)	52	mg/l	6/29/99
Magnesium	4.0	mg/l	6/29/99
Manganese	<0.03	mg/l	6/29/99
Lead	0.009	mg/l	6/29/99
pH	6.2	Std. unit	6/29/99
Zinc	<0.05	mg/l	6/29/99

Date Received: 6/29/99 **Report Date:** 7/9/99 **Reported By:**
Today's Date: 7/9/99 **Ref:** 9357 **Sample Number:** AA17683

Residential Well #3 Sampled After Water Ran For 15 minutes

North Carolina State Laboratory of Public Health
Department of Health and Human Services
P. O. Box 28047 -- 306 N. Wilmington St. -- Raleigh, N. C. 27611-8047

INORGANIC CHEMICAL ANALYSIS - PRIVATE WATER SYSTEM

Name of System: Bullard, J.M.
Address: 4006 Shedgewood Ln.
Greensboro, NC **Zip:**
County: GUILFORD
Report To: Guilford Co. Health Dept. **ATTN:** Eric Ireland
Post Office Box 3508 (336) 373-7613
Greensboro, NC 27402-3508
Courier: 02-15-32

Source of Water: Ground
Source of Sample:
Type of Sample: Raw
Type of Treatment: None
Type of Analysis PRIVATE

Collected By: PGE **Date:** 6/28/99 **Time:** 2:15:00 PM
Location of sampling point: front spigot
Remarks: Sample #3

Parameters	Results	Units	Date Analyzed:
Alkalinity as CaCO3	50	mg/l	6/29/99
Arsenic	<0.01	mg/l	6/29/99
Barium	0.1	mg/l	6/29/99
Calcium	14.5	mg/l	6/29/99
Cadmium	<0.005	mg/l	6/29/99
Chloride	13	mg/l	6/29/99
Chromium	0.02	mg/l	6/29/99
Copper	0.10	mg/l	6/29/99
Fluoride	<0.10	mg/l	6/29/99
Iron	4.63	mg/l	6/29/99
Hardness as CaCO3 (Ca,Mg)	53	mg/l	6/29/99
Magnesium	4.1	mg/l	6/29/99
Manganese	<0.03	mg/l	6/29/99
Lead	0.016	mg/l	6/29/99
pH	6.2	Std. unit	6/29/99
Zinc	<0.05	mg/l	6/29/99

Date Received: 6/29/99 **Report Date:** 7/9/99 **Reported By:**
Today's Date: 7/9/99 **Ref:** 9358 **Sample Number:** AA17684

NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF EPIDEMIOLOGY
OCCUPATIONAL AND ENVIRONMENTAL EPIDEMIOLOGY SECTION

DRINKING WATER HEALTH RISK EVALUATION
GENERAL

DATE 11/4/98 **COUNTY** Guilford **LABORATORY #** 983047

( ) Based of these analytical results, this water should be considered safe for normal usage.

( ) Chemical analysis did not show any contamination. Water should be resampled if odor or taste persists.

( ) The water should not be used for drinking or cooking purposes; avoid prolonged bathing/showering.

( ) Bases in these analytical results, this water is highly contaminated and should not be used for drinking, cooking, or bathing/showering.

(✓) The laboratory results are not conclusive, please resample. immediately

PLEASE INDICATE ON LAB SHEET THAT IT IS A RESAMPLE AND PROVIDE PREVIOUS SAMPLE NUMBER(S).

COMMENTS: High levels may be from new PVC pipes. Flushing out the system for 1-2 weeks should bring the levels down. Then resample.

For further information, contact Dr. Ken Rudo, Occupational and Environmental Epidemiology Section, (919) 715-6430.

N. C. Department of Health and Human Services
State Laboratory of Public Health
P.O.Box 28047, Raleigh, N.C. 27611

PETROLEUM PRODUCTS

Environmental Sciences Analysis Report

Please Read instruction sheet
VOA vials contain 1:1 HCl

Name of Owner, Patient or Supply: JERRY SPARROW Telephone # (336) 852-2961

Address: 4004 Adanson Rd County: Guilford

Greensboro NC Zip: 27407

****

Report to: CARL Parsons Collected By:

Telephone # (336) 333-6805 Telephone # (336) 470-2759

Address: # 201 S. Eugene ST Date Collected: 9/23/98

Greensboro, NC 27402 Analysis Desired: petroleum

Residential Well #10

Laboratory Number	Sample #	Sample Description or Remarks	Results In
983047			~~SEE ATTACHED SHEET(S)~~

Date Received 9-24-98 NB Date Reported 10-02-98

Date Extracted 9-29-98 KM Date Analyzed VOC 9/24/98 9pm; PT/GC/MS 9-29-98 11, EC/PID 9-30-98 KM

Reported By: John L. Neal

John L. Neal, Supervisor
Environmental Organic Chemistry

DIVISION OF HEALTH AND HUMAN SERVICES
STATE LABORATORY OF PUBLIC HEALTH
PO BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

ORGANIC CHEMICAL ANALYSIS / PURGEABLE COMPOUNDS

LABORATORY # 983047

COMPOUND	MDL	µg/l	COMPOUND	MDL	µg/l
Chloromethane	2.0 ug/l	U	1,2-Dichloropropane	0.5 ug/l	U
Vinyl Chloride	↓	↓	Dibromomethane	↓	↓
Bromomethane			Bromodichloromethane		0.9
Chloroethane			Cis-1,3-Dichloropropene		U
Trichlorofluoromethane	↓		4-Methyl-2-Pentanone (MIBK)		trace
1,1-Dichloroethene	0.5 ug/l		Toluene		trace
Acetone	2.0 ug/l		Trans-1,3-Dichloropropene		U
Iodomethane	0.5 ug/l		1,1,2-Trichloroethane		↓
Carbon Disulfide	↓		Tetrachloroethene		
Methylene Chloride			2-Hexanone		↓
Acrylonitrile			Dibromochloromethane		trace
Trans-1,2-Dichloroethene			Ethylene Dibromide		U
Methyl-t-Butyl-Ether		↓	Chlorobenzene		↓
1,1-Dichloroethane		trace	1,1,1,2-Tetrachloroethane		
Isopropyl Ether		U	Ethyl Benzene		↓
Cis-1,2-Dichloroethene	↓	↓	Xylenes		trace
2-Butanone	2.0 ug/l	803.3 J	Styrene		trace
Tetrahydrofuran	↓	2394.0 J	Bromoform		trace
Chloroform	0.5 ug/l	3.8	1,1,2,2-Tetrachloroethane		U
1,1,1-Trichloroethane	↓	U	1,2,3-Trichloropropane		↓
Carbon Tetrachloride		↓	1,4-Dichlorobenzene		
Benzene			1,2-Dichlorobenzene	↓	
1,2-Dichloroethane			1,2-Dibromo-3-Chloropropane	2.0 ug/l	↓
Trichloroethene	↓	↓			

C - Possible lab contamination or background
J - Estimated Value
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit.
JJ - Tentative identification.
D - Sample diluted. MDL's do not apply.

NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF EPIDEMIOLOGY
OCCUPATIONAL AND ENVIRONMENTAL EPIDEMIOLOGY SECTION

DRINKING WATER HEALTH RISK EVALUATION
GENERAL

DATE 11/4/98 **COUNTY** Lee/Franklin **LABORATORY #** 983408, 983409

(✓) Based of these analytical results, this water should be considered safe for normal usage.

( ) Chemical analysis did not show any contamination. Water should be resampled if odor or taste persists.

( ) The water should not be used for drinking or cooking purposes; avoid prolonged bathing/showering.

( ) Bases in these analytical results, this water is highly contaminated and should not be used for drinking, cooking, or bathing/showering.

( ) The laboratory results are not conclusive, please resample.

PLEASE INDICATE ON LAB SHEET THAT IT IS A RESAMPLE AND PROVIDE PREVIOUS SAMPLE NUMBER(S).

COMMENTS:

For further information, contact Dr. Ken Rudo, Occupational and Environmental Epidemiology Section, (919) 715-6430.

DIVISION OF LABORATORY SERVICES- ENVIRONMENTAL SCIENCES
P O BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

Laboratory No. 983408 **Purgeable Compounds** **Date of Analysis** 10/22/98

COMPOUND	ug/l	COMPOUND	ug/l
DICHLORODIFLUOROMETHANE	U	✓CHLOROBENZENE	U
CHLOROMETHANE		✓ETHYLBENZENE	
✓VINYL CHLORIDE		1,1,1,2-TETRACHLOROETHANE	
BROMOMETHANE		✓p-XYLENE	
CHLOROETHANE		✓m-XYLENE	
TRICHLOROFLUOROMETHANE		✓o-XYLENE	
✓1,1-DICHLOROETHYLENE		✓STYRENE	
METHYLENE CHLORIDE		BROMOFORM	
tert-BUTYL METHYL ETHER		ISOPROPYLBENZENE	
✓trans-1,2-DICHLOROETHYLENE		1,1,2,2-TETRACHLOROETHANE	
ISOPROPYL ETHER		BROMOBENZENE	
1,1-DICHLOROETHANE		n-PROPYLBENZENE	
2,2-DICHLOROPROPANE		1,2,3-TRICHLOROPROPANE	
✓CIS-1,2-DICHLOROETHYLENE		2-CHLOROTOLUENE	
CHLOROFORM		1,3,5-TRIMETHYLBENZENE	
(BCM) BROMOCHLOROMETHANE		4-CHLOROTOLUENE	
✓1,1,1-TRICHLOROETHANE		tert-BUTYL BENZENE	
1,1-DICHLOROPROPENE		PENTACHLOROETHANE	
✓CARBON TETRACHLORIDE		1,2,4-TRIMETHYLBENZENE	
✓BENZENE		sec-BUTYL BENZENE	
✓1,2-DICHLOROETHANE		p-ISOPROPYLTOLUENE	
✓TRICHLOROETHYLENE		1,3-DICHLOROBENZENE	
✓1,2-DICHLOROPROPANE		✓1,4-DICHLOROBENZENE	
BROMODICHLOROMETHANE		n-BUTYLBENZENE	
DIBROMOMETHANE		✓1,2-DICHLOROBENZENE	
✓TOLUENE		BIS (2-CHLOROISOPROPYL) ETHER	
1,1,2-TRICHLOROETHANE		1,2-DIBROMO-3-CHLOROPROPANE	
✓TETRACHLOROETHYLENE		1,2,4-TRICHLOROBENZENE	
1,3-DICHLOROPROPANE		HEXACHLOROBUTADIENE	
DIBROMOCHLOROMETHANE		NAPHTHALENE	
1,2-DIBROMOETHANE (EDB)		1,2,3-TRICHLOROBENZENE	↓
1-CHLOROHEXANE	↓		

COMMENTS: NO VOLATILE COMPOUNDS IDENTIFIED

MDL - MINIMUM DETECTION LIMIT FOR WATER (EPA Method 502.2), is 1.0 ug/l.

J - ESTIMATED VALUE.
K - ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
L - ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
U - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED.
NA - NOT ANALYZED.
1/ - TENTATIVE IDENTIFICATION.
✓ - REGULATED VOC.
T - TRIHALOMETHANE

N.C. DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF LABORATORY SERVICES- ENVIRONMENTAL SCIENCES
P O BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

Laboratory No. 983409 Purgeable Compounds Date of Analysis 10/22/98

COMPOUND	µg/l	COMPOUND	µg/l
DICHLORODIFLUOROMETHANE	U	✓CHLOROBENZENE	U
CHLOROMETHANE		✓ETHYLBENZENE	trace
✓VINYL CHLORIDE		1,1,1,2-TETRACHLOROETHANE	U
BROMOMETHANE		✓p-XYLENE	3 IK
CHLOROETHANE		✓m-XYLENE	3
TRICHLOROFLUOROMETHANE		✓o-XYLENE	trace
✓1,1-DICHLOROETHYLENE		✓STYRENE	U
METHYLENE CHLORIDE		BROMOFORM	
tert-BUTYL METHYL ETHER		ISOPROPYLBENZENE	
✓trans-1,2-DICHLOROETHYLENE		1,1,2,2-TETRACHLOROETHANE	
ISOPROPYL ETHER		BROMOBENZENE	
1,1-DICHLOROETHANE		n-PROPYLBENZENE	
2,2-DICHLOROPROPANE		1,2,3-TRICHLOROPROPANE	
✓CIS-1,2-DICHLOROETHYLENE		2-CHLOROTOLUENE	
CHLOROFORM	IK T	1,3,5-TRIMETHYLBENZENE	
(BCM) BROMOCHLOROMETHANE	U	4-CHLOROTOLUENE	
✓1,1,1-TRICHLOROETHANE		tert-BUTYL BENZENE	
1,1-DICHLOROPROPENE		PENTACHLOROETHANE	
✓CARBON TETRACHLORIDE		1,2,4-TRIMETHYLBENZENE	
✓BENZENE		sec-BUTYL BENZENE	
✓1,2-DICHLOROETHANE		p-ISOPROPYLTOLUENE	
✓TRICHLOROETHYLENE		1,3-DICHLOROBENZENE	
✓1,2-DICHLOROPROPANE		✓1,4-DICHLOROBENZENE	
BROMODICHLOROMETHANE		n-BUTYLBENZENE	
DIBROMOMETHANE		✓1,2-DICHLOROBENZENE	
✓TOLUENE	7.4	BIS (2-CHLOROISOPROPYL) ETHER	
1,1,2-TRICHLOROETHANE	U	1,2-DIBROMO-3-CHLOROPROPANE	
✓TETRACHLOROETHYLENE		1,2,4-TRICHLOROBENZENE	
1,3-DICHLOROPROPANE		HEXACHLOROBUTADIENE	
DIBROMOCHLOROMETHANE		NAPHTHALENE	
1,2-DIBROMOETHANE (EDB)		1,2,3-TRICHLOROBENZENE	
1-CHLOROHEXANE			
Methyl ethyl Ketone	12.8		
Tetrahydrofuran	43.0		

COMMENTS: Unidentified peaks present

MDL - MINIMUM DETECTION LIMIT FOR WATER (EPA Method 502.2), is 1.0 ug/l.

J - ESTIMATED VALUE.
K - ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
L - ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
U - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED.
NA - NOT ANALYZED.
1/ - TENTATIVE IDENTIFICATION.
✓ - REGULATED VOC.
T - TRIHALOMETHANE

N.C. DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF LABORATORY SERVICES- ENVIRONMENTAL SCIENCES
P O BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

Laboratory No. 983410 Blank (dated 5/22/97) Purgeable Compounds Date of Analysis 10/22/98

COMPOUND	µg/l	COMPOUND	µg/l
DICHLORODIFLUOROMETHANE	U	✓CHLOROBENZENE	U
CHLOROMETHANE		✓ETHYLBENZENE	
✓VINYL CHLORIDE		1,1,1,2-TETRACHLOROETHANE	
BROMOMETHANE		✓p-XYLENE	
CHLOROETHANE		✓m-XYLENE	
TRICHLOROFLUOROMETHANE		✓o-XYLENE	
✓1,1-DICHLOROETHYLENE		✓STYRENE	
METHYLENE CHLORIDE		BROMOFORM	
tert-BUTYL METHYL ETHER		ISOPROPYLBENZENE	
✓trans-1,2-DICHLOROETHYLENE		1,1,2,2-TETRACHLOROETHANE	
ISOPROPYL ETHER		BROMOBENZENE	
1,1-DICHLOROETHANE		n-PROPYLBENZENE	
2,2-DICHLOROPROPANE		1,2,3-TRICHLOROPROPANE	
✓CIS-1,2-DICHLOROETHYLENE		2-CHLOROTOLUENE	
CHLOROFORM		1,3,5-TRIMETHYLBENZENE	
(BCM) BROMOCHLOROMETHANE		4-CHLOROTOLUENE	
✓1,1,1-TRICHLOROETHANE		tert-BUTYL BENZENE	
1,1-DICHLOROPROPENE		PENTACHLOROETHANE	
✓CARBON TETRACHLORIDE		1,2,4-TRIMETHYLBENZENE	
✓BENZENE		sec-BUTYL BENZENE	
✓1,2-DICHLOROETHANE		p-ISOPROPYLTOLUENE	
✓TRICHLOROETHYLENE		1,3-DICHLOROBENZENE	↓
✓1,2-DICHLOROPROPANE		✓1,4-DICHLOROBENZENE	1K
BROMODICHLOROMETHANE		n-BUTYLBENZENE	U
DIBROMOMETHANE		✓1,2-DICHLOROBENZENE	
✓TOLUENE		BIS (2-CHLORDISOPROPYL) ETHER	
1,1,2-TRICHLOROETHANE		1,2-DIBROMO-3-CHLOROPROPANE	
✓TETRACHLOROETHYLENE		1,2,4-TRICHLOROBENZENE	
1,3-DICHLOROPROPANE		HEXACHLOROBUTADIENE	
DIBROMOCHLOROMETHANE		NAPHTHALENE	
1,2-DIBROMOETHANE (EDB)		1,2,3-TRICHLOROBENZENE	↓
1-CHLOROHEXANE	↓		

COMMENTS:

MDL - MINIMUM DETECTION LIMIT FOR WATER (EPA Method 502.2), is 1.0 ug/l.

J - ESTIMATED VALUE.
K - ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
L - ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
U - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED.
NA - NOT ANALYZED.
1/ - TENTATIVE IDENTIFICATION.
✓ - REGULATED VOC.
T - TRIHALOMETHANE

NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF EPIDEMIOLOGY
OCCUPATIONAL AND ENVIRONMENTAL EPIDEMIOLOGY SECTION

DRINKING WATER HEALTH RISK EVALUATION
GENERAL

DATE 7/7/99 **COUNTY** Guilford **LABORATORY #** 99/553 → 559

(✓) Based of these analytical results, this water should be considered safe for normal usage.

( ) Chemical analysis did not show any contamination. Water should be resampled if odor or taste persists.

( ) The water should not be used for drinking or cooking purposes; avoid prolonged bathing/showering.

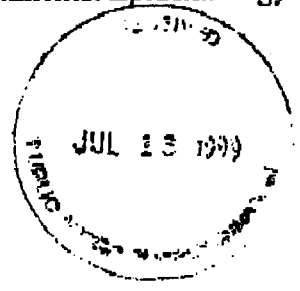
( ) Bases in these analytical results, this water is highly contaminated and should not be used for drinking, cooking, or bathing/showering.

( ) The laboratory results are not conclusive, please resample.

PLEASE INDICATE ON LAB SHEET THAT IT IS A RESAMPLE AND PROVIDE PREVIOUS SAMPLE NUMBER(S).

COMMENTS:

For further information, contact Dr. Ken Rudo, Occupational and Environmental Epidemiology Section, (919) 715-6430.



DHHS 3891 (2/98)
Occupational and Environmental Epidemiology Section (Review 2/01)

N. C. Department of Health and Human Services
State Laboratory of Public Health
P.O.Box 28047, Raleigh, N.C. 27611

VOC

Please Read instruction sheet
VOA vials contain 1:1 HCl

Environmental Sciences Analysis Report

Name of Owner, Patient or Supply: ~~#C000305 GUILFORD COUNTY HEALTH DEPT.~~ LABORATORY

Address: ~~[illegible] N. EUGENE ST.-P. O. BOX 3508~~ GREENSBORO, NC 27401

Zip: _____

Telephone # (336) 373-3158

County: GUILFORD
GARRIS EVANS

****

Report to: ~~#C000305 GUILFORD COUNTY HEALTH DEPT.~~ LABORATORY

Address: ~~[illegible] N. EUGENE ST.-P. O. BOX 3508~~ GREENSBORO, NC 27401

Telephone # (336) 373-3186

Collected By: RJE

Date Collected: 5/17/99

Analysis Desired: VOC

RECEIVED
JUL 16 1999
PUBLIC WATER SUPPLY SECTION

Residential Well #10

Laboratory Number	Sample #	Sample Description or Remarks	Results In
991555		3915 N FREMONT DR	SEE ATTACHED SHEET(S)
991556		4002 ADAMSON DR	
991557		4004 ADAMSON DR	
991558		4008 ADAMSON DR	
991559		4906 ADAMSON DR	
991560		Trip Blank	

RECEIVED
JUL 23 1999
OCCUPATIONAL & ENVIRONMENTAL EPIDEMIOLOGY SECTION

Date Received 5-18-99 WO

Date Reported 5-25-99

Date Extracted _____

Date Analyzed VOC 5/18-5/19/99 PT/GC/MS 5-21-99 TJ

Reported By: John E. Neal
John E. Neal, Supervisor
Environmental Organic Chemistry

DHHS Form 2364 Revised (11-97)

(1)

STATE LABORATORY OF PUBLIC HEALTH
PO BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

ORGANIC CHEMICAL ANALYSIS

PURGEABLE COMPOUNDS	LAB NO	991555	991556	991557	991558	991559	
	FIELD NO						
COMPOUND	TYPE	( )	( )	( )	( )	( )	( )
	↓ MDL ↓ [ppb]	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	ppb ppm
CHLOROMETHANE	2.0	U	U	U	U	U	
VINYL CHLORIDE							
BROMOMETHANE							
CHLOROETHANE							
TRICHLOROFLUOROMETHANE	↓						
1,1-DICHLOROETHENE	0.5						
ACETONE	2.0						
IODOMETHANE	0.5						
CARBON DISULFIDE							
METHYLENE CHLORIDE							
ACRYLONITRILE							
TRANS-1,2-DICHLOROETHENE		↓	↓				
METHYL-t-BUTYL-ETHER		trace	trace	↓			
1,1-DICHLOROETHANE		U	U	trace			
ISOPROPYL ETHER				U			
CIS-1,2-DICHLOROETHENE	↓			↓			
2-BUTANONE	2.0			4.9			
TETRAHYDROFURAN	↓			17.2			
CHLOROFORM	0.5			U			
1,1,1-TRICHLOROETHANE							
CARBON TETRACHLORIDE							
BENZENE							
1,2-DICHLOROETHANE							
TRICHLOROETHENE							
1,2-DICHLOROPROPANE							
DIBROMOMETHANE	↓	↓	↓	↓	↓	↓	

trace = < 0.5 ppb

C - Possible lab contamination or background
J - Estimated value
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit.
NA - Not analyzed.
1/ - Tentative identification.
D - SAMPLE DILUTED. MDL'S DO NOT APPLY.

(2)

STATE LABORATORY OF PUBLIC HEALTH
PO BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

ORGANIC CHEMICAL ANALYSIS

PURGEABLE COMPOUNDS	LAB NO	991555	991556	991557	991558	991559	
	FIELD NO						
COMPOUND	TYPE	( )	( )	( )	( )	( )	( )
	↓ MDL (ppb) ↓	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	ppb ppm
BROMODICHLOROMETHANE	0.5	U	U	U	U	U	
CIS-1,3-DICHLOROPROPENE		↓	↓	↓	↓	↓	
4-METHYL-2-PENTANONE				trace U			
TOLUENE				0.7			
TRANS-1,3-DICHLOROPROPENE				U			
1,1,2-TRICHLOROETHANE		↓	↓	↓	↓	↓	
TETRACHLOROETHENE		trace		trace	trace	trace	
2-HEXANONE		U		trace U	U	U	
DIBROMOCHLOROMETHANE				U			
ETHYLENE DIBROMIDE							
CHLOROBENZENE							
1,1,1,2-TETRACHLOROETHANE				↓			
ETHYL BENZENE				trace			
XYLENES				trace			
STYRENE				U			
BROMOFORM							
1,1,2,2-TETRACHLOROETHANE							
1,2,3-TRICHLOROPROPANE							
1,4-DICHLOROBENZENE							
1,2-DICHLOROBENZENE	↓						
1,2,-DIBROMO-3-CHLOROPROPANE	2.0	↓	↓	↓	↓	↓	

JUL 15 1999

trace: <0.5ppb

C - Possible lab contamination or background.
J - Estimated value
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit.
NA - Not analyzed.
J/ - Tentative identification.
D - SAMPLE DILUTED. MDL's DO NOT APPLY.

DHHS 3065-2 (1/98)

FURGCOM2.ORG

N.C. DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF LABORATORY SERVICES- ENVIRONMENTAL SCIENCES
P O BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

Laboratory No. 99/560 Blank (5-7-99) Purgeable Compounds Date of Analysis 5/19/99

COMPOUND	µg/l	COMPOUND	µg/l
DICHLORODIFLUOROMETHANE	U	✓CHLOROBENZENE	U
CHLOROMETHANE		✓ETHYLBENZENE	
✓VINYL CHLORIDE		1,1,1,2-TETRACHLOROETHANE	
BROMOMETHANE		✓p-XYLENE	
CHLOROETHANE		✓m-XYLENE	
TRICHLOROFLUOROMETHANE		✓o-XYLENE	
✓1,1-DICHLOROETHYLENE		✓STYRENE	
METHYLENE CHLORIDE		BROMOFORM	
tert-BUTYL METHYL ETHER		ISOPROPYLBENZENE	
✓trans-1,2-DICHLOROETHYLENE		1,1,2,2-TETRACHLOROETHANE	
ISOPROPYL ETHER		BROMOBENZENE	
1,1-DICHLOROETHANE		n-PROPYLBENZENE	
2,2-DICHLOROPROPANE		1,2,3-TRICHLOROPROPANE	
✓CIS-1,2-DICHLOROETHYLENE		2-CHLOROTOLUENE	
CHLOROFORM		1,3,5-TRIMETHYLBENZENE	
(BCM) BROMOCHLOROMETHANE		4-CHLOROTOLUENE	
✓1,1,1-TRICHLOROETHANE		tert-BUTYL BENZENE	
1,1-DICHLOROPROPENE		PENTACHLOROETHANE	
✓CARBON TETRACHLORIDE		1,2,4-TRIMETHYLBENZENE	
✓BENZENE		sec-BUTYL BENZENE	
✓1,2-DICHLOROETHANE		p-ISOPROPYLTOLUENE	
✓TRICHLOROETHYLENE		1,3-DICHLOROBENZENE	
✓1,2-DICHLOROPROPANE		✓1,4-DICHLOROBENZENE	
BROMODICHLOROMETHANE		n-BUTYLBENZENE	
DIBROMOMETHANE		✓1,2-DICHLOROBENZENE	
✓TOLUENE		BIS (2-CHLOROISOPROPYL) ETHER	
1,1,2-TRICHLOROETHANE		1,2-DIBROMO-3-CHLOROPROPANE	
✓TETRACHLOROETHYLENE		1,2,4-TRICHLOROBENZENE	
1,3-DICHLOROPROPANE		HEXACHLOROBUTADIENE	
DIBROMOCHLOROMETHANE		NAPHTHALENE	
1,2-DIBROMOETHANE (EDB)		1,2,3-TRICHLOROBENZENE	
1-CHLOROHEXANE			

COMMENTS: NO VOLATILE COMPOUNDS IDENTIFIED

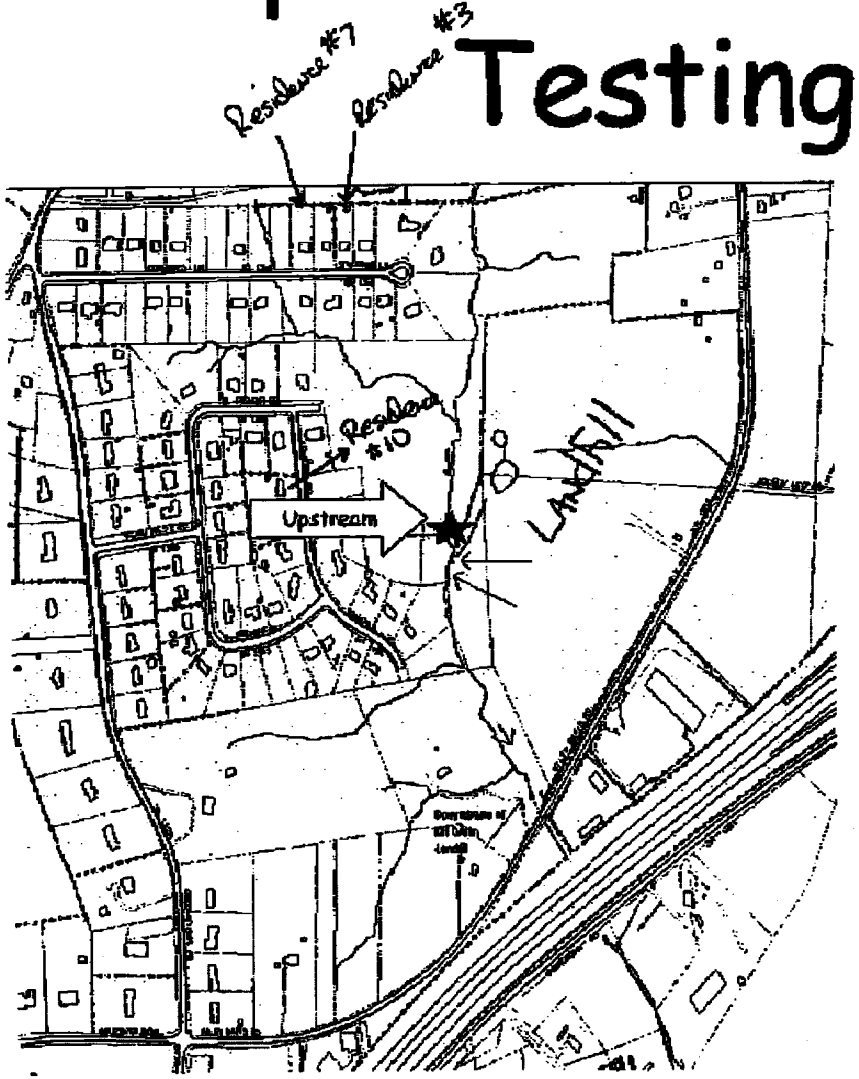
RECEIVED
JUL 16 1999
PUBLIC WATER SUPPLY SECTION

'DL - MINIMUM DETECTION LIMIT FOR WATER (EPA Method 502.2), is 1.0 ug/l.

- ESTIMATED VALUE.
ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
ATERIAL WAS ANALYZED FOR BUT NOT DETECTED.
ANALYZED.
ATIVE IDENTIFICATION.
ATED VOC.
OMETHANE

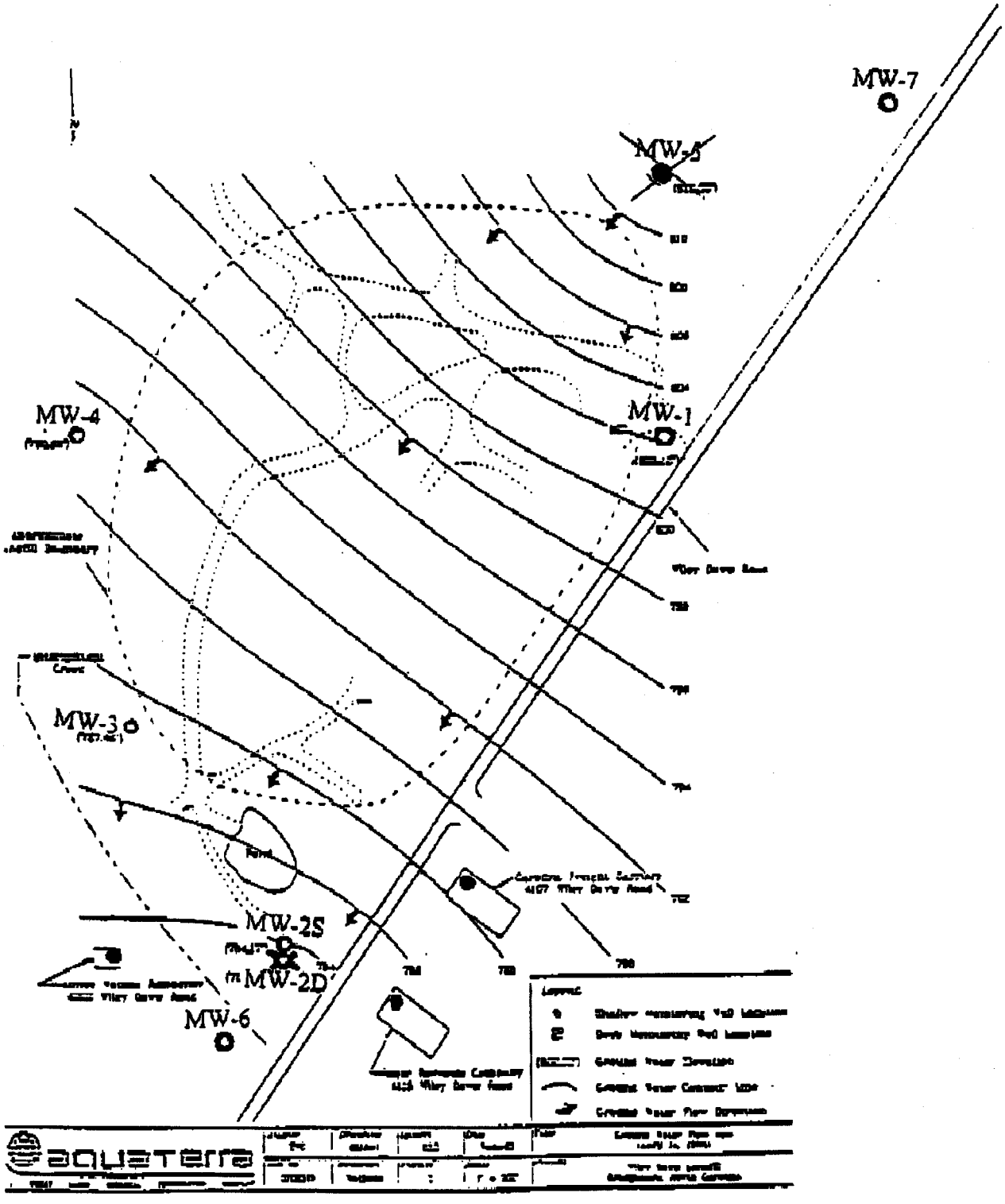
Landfill location vs. Residential locations

Upstream Surface Water Testing Results



- Cadmium <2.0 ppb
- Copper <2.0 ppb
- Nickel <10.0 ppb
- Lead <10.0 ppb
- Zinc <10.0 ppb
- Iron .620 ppm
- No volatile organic compounds detected

Monitoring Wells at Landfill



CENTER FOR HEALTH, ENVIRONMENT AND JUSTICE
P.O. Box 6806 Falls Church, VA 22040-6806

August 9, 1999

Mr. Richard Fayssoux, Jr.
4005 Sedgewood Lane
Greensboro, NC 27407

Dear Mr. Fayssoux:

I have reviewed the test results that you sent to CHEJ that were taken from the monitoring wells at the Wiley Davis Landfill located in Guilford County and from private drinking water wells located nearby. The Wiley Davis Landfill accepted primarily construction and demolition waste, though there are reports of other waste being dumped in the landfill as well. The data I have reviewed provides analytical results of samples collected from 7 groundwater monitoring wells located on the landfill property and from 21 private wells that provide drinking water to residents living near the landfill site. These samples were collected from April to June of this year and were analyzed primarily for volatile organic chemicals (VOCs) and a limited number of heavy metals and other parameters. These two analytical groups (VOCs and heavy metals) include many common contaminants found in leachate generated by solid waste landfills. Most of the analyses were done by the State Laboratory of Public Health for state of North Carolina. The only exception is the May 1999 on-site groundwater testing which was conducted by Pace Analytical Services, Inc.

Overall, this testing shows that groundwater at the site has been contaminated by chemicals leaking from the landfill. The contamination appears to be the heaviest on the western and southwestern side of the landfill where monitoring wells MW-2S, MW-2D, MW-4 and MW-6 are located. Well MW-6 has the highest level of contamination closely followed by MW-4. It is also apparent that some of the same chemicals that were found in the groundwater monitoring wells at the landfill site are also showing up in the several of the private wells located on the western side of the landfill. In general, the direction of groundwater flow across the landfill is towards the west.

One contaminant was found at levels well above any other. This contaminant was tetrahydrofuran which was found at 214 parts per billion (ppb) in MW-6, 187 ppb in MW-2S, and 154 ppb in MW-2D. It was also found in MW-3 and MW-4. Several other contaminants were found in MW-2S, MW-2D, MW-3, MW-4, and MW-6: benzene, 1,1-dichloroethane (DCA), chloroethane, and methyl ethyl ketone (MEK). All of these chemicals affect the central nervous system and liver; benzene is a known human carcinogens; 1,1-DCA and chloroethane can cause kidney damage. Brief toxicity information on these substances is enclosed. Additional substances were found in MW-4 and MW-6, though at low levels.

Unfortunately, the documents I received did not include much specific information about the monitoring wells including how the wells were installed, water depth, soil type surrounding the well, well depth, depth of the screen in the well (the portion of the well where water enters). Most of this information would be available in what are referred to as "well borings" or log borings. Later, I did obtain the depths of the monitoring wells which was useful.

In addition, the wells were generally sampled during the same time period from April to June of this year. This one time snap-shot of the groundwater gives a very limited picture of the overall groundwater status at the landfill. Additional samples taken during other seasons and over time can help establish if there are seasonal changes in the water level and in the direction and rate of groundwater flow. Such changes could result in significant changes in contaminant movement at the site which would be reflected in different contaminant levels detected in the monitoring wells.

One interesting observation about the contamination in the monitoring wells is that the highest contamination occurred in two areas. One area is clustered in the southwest corner of the site as reflected in wells MW-2S, MW-2D, and MW-6. The second area is reflected by well MW-4. Between these two areas is another well, MW-3, that is only slightly contaminated. Since the groundwater flow is moving generally to the west and southwest, this observation is puzzling. However, there may be a different soil type that slows the groundwater flow towards MW-3, as compared to well MW-4 and the cluster of wells MW-2S, MW-2D, and MW-6. This observation may also be partially explained by the depth of the wells. The information I had on well depths was incomplete and not helpful in addressing this question.

The results of the testing of the private drinking water wells are difficult to evaluate without more information about the house location, the depth of the well, and specific information about the contaminant plume including its location and dimensions and the direction and rate of groundwater flow. Several points are clear, however. First, the wells on the western side of the landfill, apparently down gradient from the landfill, are consistently more contaminated than wells in other areas. Second, several of the same contaminants, tetrahydrofuran and methyl ethyl ketone in particular, that are found in the private wells are also present in the groundwater monitoring wells. In addition, several contaminants are consistently found at low levels in the private wells, but not in the groundwater monitoring wells. These include perchlorethylene (PCE), methyl tert-butyl ether, and chloroform.

I suspect that what we are seeing with this limited picture of the groundwater contamination is the tip of the iceberg. It may be that the contamination is just beginning to reach the private wells. Whether contamination reaches these wells depends on the depth of the well and the dimensions

and rate of movement of the contaminant plume. However, this information is not known and until it is defined, the threat posed by contaminants leaking from the landfill will remain unknown.

There are two significant concerns I have about the data itself. First, the number of substances that were looked for in the wells is limited. In both the on-site groundwater monitoring wells and in the private drinking water wells, only a limited number of substances were analyzed for. The lab looked primarily for volatile organic chemicals (VOCs) and some heavy metals. What's missing is the semi-volatile organics such as polynuclear aromatic hydrocarbons (PAHs) and chlorinated benzenes, pesticides, PCBs and the metals chromium, cadmium, mercury, cyanide, and nickel. The testing conducted by Pace Analytical Services did include more VOCs and all of the heavy metals, but no pesticides, PCBS, or PAHs. What you want them to test for is a group of chemicals known as priority pollutants. This is a list of 128 chemical substances that are commonly found in contaminated groundwater. A general description and a list of these chemicals is enclosed.

The second major concern I have with the data is the detection limits used by Pace Analytical. Detection limits define the lowest level of contamination that can be identified with accuracy by the testing. These limits are generally set before the testing begins. If they are set too high, then contamination below this level will not be detected even when it's there. Pace used different detection limits for different samples with values ranging from 5 to 100 ppb for VOCs. The state lab used a detection limit of 0.5 ppb VOCs.

Although there are no specific standards for what detection level to use in analyzing groundwater, the detection limits should not vary from sample to sample. They should remain the same for all samples. There are, however, several guidelines that can be used in decididing what detection limit to use. First, the USEPA has set detection limits for testing at Superfund sites that EPA contract laboratories are required to use. A list of these limits is included on the priority pollutant list. A second alternative is to use no more than 20% of the drinking water standard. One problem with this approach is that there are standards for only a small number of substances (see enclosed list). Often, industry will set the detection limits at the drinking water standard which is too high. In this instance, the detection limits used by PACE Analytic are too high and should be lowered. The detection level used by the state lab was more appropriate and should be used in any future sampling.

Lastly, for many of the substances found in the wells, the level of contamination was described as a "trace" amount. While it is certainly better that trace amounts rather than in higher levels were found, I would not be comforted by this information alone. Additional testing needs to be done as well as significant information needs to be obtained and to understand the extend and dimensions of the contaminant plume as well as define the direction and rate of flow of the plume.

Furthermore, while these levels may be considered low, they are not necessarily "safe" or inconsequential. Exposure to the chemicals found in the monitoring wells even at the levels found pose some health risks. What those risks are depend on the levels of the chemicals, how many chemicals you are exposed to, how long you are exposed to them, and individual susceptibility which varies widely from person to person.

The important point here is not whether the chemicals found in the monitoring wells exceed drinking water standards, but rather whether the groundwater has become contaminated by chemicals leaking from the landfill. It is clear from the data that this has already occurred and since the chemicals are already showing up in private drinking water wells off-site, you cannot afford to wait until levels exceed drinking water standards before taking action. At that point, it will be too late.

In closing, it is clear that chemicals leaking from the Wiley Davis Landfill have leaked into the groundwater at the site and have traveled off-site to several private drinking water wells located nearby. This contamination poses health risks to people using the private wells for drinking and other purposes. In order to define the scope of these risks, additional testing and information is needed. Additional testing for a broader range of substance, namely the priority pollutants, needs to be conducted for both the private drinking water wells and on-site groundwater monitoring wells. Samples should be taken immediately and during other seasons and over time to help establish if there are seasonal changes in water levels and in the direction and rate of groundwater flow. Such changes could result in significant changes in contaminant movement at the site. Specific information on how the monitoring wells were installed, water depth, soil type surrounding the well, well depth, depth of the screen in the well should be made available for all testing in order to make transparent the location and dimensions of the contaminant plume, how fast it is moving and in what direction. With this information, it is possible to evaluate the risks posed by the contaminants found in the private drinking water wells and the general public health risks posed by the contamination leaking form the landfill site.

I hope these comments are helpful. Feel free to contact me if you have any questions or need any additional information.

Sincerely,

Stephen U. Lester
Science Director

Groundwater Sampling Results for Monitoring Wells

- Split Sample of Consult

Inorganic (part of per million, ppm)

Parameter	State Standard	MW-1	MW-2S	MW-2D	MW-3	MW-4	MW-6	MW-7
Iron	0.3	2.47	17.22	4.51	56.3	7.02	22.27	13.98
Manganese	0.05	0.20	118.0	9.84	2.8	106.0	8.32	0.58
Lead	<0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009
pH	6.5-8.5	6.4	6.7	6.8	6.8	6.8	6.9	6.9

Groundwater Sampling Results for Water Supply Wells

Inorganic (part of per million, ppm)

Parameter	State Standard	Adamson Dr.		Wiley Davis Road		Shedgewood Lane							
		4101	4004	4202	4204	4027	4025	4018	4012	4010	4007	4006	4005
Copper	1.0	<0.05	<0.05	0.13	0.11	<0.05	<0.05	<0.05	<0.05	1.78	<0.05	0.31	<0.05
Iron	0.3	<0.05	<0.05	0.14	10.2	4.52	0.67	0.55	0.38	58.9	0.38	8.56	<0.05
Manganese	0.05	<0.03	0.03	<0.03	0.33	0.15	<0.03	<0.03	<0.03	0.5	0.08	<0.03	0.05
Lead	<0.015	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.115	<0.005	0.034	<0.005
Zinc	2.1	1.24	1.36	<0.05	0.05	<0.05	0.13	<0.05	<0.05	0.72	<0.05	<0.05	<0.05
pH	6.5-8.5	6.4	7.3	6.8	6.5	7.2	6.6	6.6	6.6	6.7	7.2	6.2	7.0

Groundwater Sampling Results for Water Supply

inorganic (in part of million, ppm)

Parameter	State Standard	Groometown Road		Wiley Davis Road			Fremont Drive	
		4119	4113	3927	4002	3924	4001	4000
Copper	1.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	0.3	0.45	0.90	0.08	0.12	<0.05	<0.05	<0.05
Manganese	0.05	<0.03	0.05	<0.03	<0.03	<0.03	<0.03	<0.03
Lead	0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pH	6.5-8.5	6.4	6.7	6.8	6.7	6.7	6.4	6.4

Dissolved metal concentrations (in part per billion, ppb) in groundwater collected from monitoring wells

Sampling on may 3, 1999 by AquaTerra

	State Groundwater Standards	WD-1	WD-2S	WD-2D	WD-3	WD-4	WD-6	WD-7
Arsenic	50	0	0	0	5.3	0	5.2	0
Barium	2000	250	2000	160	370	740	920	230
Cadmium	5	0	0	0	0	0	0	0
Chromium	50	0	0	0	0	0	12	2.6
Lead	15	0	0	0	0	0	0	0
selenium	50	0	9.8	9.3	7.4	12	7.1	0
Silver	18	0	0	0	0	0	0	0

Groundwater Sampling Results from Monitoring Wells

(Part of per billion, ppb)

Compound	State Standard	MW-1	MW-2S	MW-2D	MW-3	MW-4	MW-6	MW-7
Benzene	1	0	3.0	1.9	<0.5	0.9	1.5	0
Vinyl chloride	0.015	0	0	0	0	0	1.9 A) B)	0
Chloroethane	2800	0	1.4 B)	1.1 B)	0	1.5 B)	2.2 B)	0
MTBE	200	0	0.5	0	0	0.8	2.4	0
Methyl ethyl keton (2-butanone)	170	2.8 B)	0	0	1.9 B)	0	0	0
Tetrahydroforan	not established	0	186.6	153.9	14.1	16.3	214.5	0
1,1-dichloroethane	700	0	<1.1	1.0	0	<0.5	2.7	0
1,2-dichloroethane	0.38	0	<0.5	<0.5	0	0	<0.5	0
Isopropyl ether	70	0	<0.5	<0.5	0	<0.5	<0.5	0
Acetone	700	0	0	0	0	0	5.1*	0
Trichlorofluomethane	2100	0	0	0	<0.5	<0.5	0.9	0
Chlorobenzene	50	<0.5	<0.5	79.2	<0.5	1.6	60.0	0
Toluene	1000	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	0
1,4-dichlorobenzene	not established	0	3.6	4.1	<0.5	0.9	3.6	0
1,2-dichlorobenzene	not established	0	4.3	<0.5	<0.5	<0.5	14.2	0

* possible lab contamination A) tentative identification B) estimated values

Groundwater Sampling Results from Water Supply Wells

Volatile Organic Compounds (part of per billion, ppb)

Compound	State Standard	Adamson Dr.							Wiley Davis		Shedgewood Ln	
		4004	4101	4102	4103	4105	4106	4107	4204	4202	4003	4010
Benzene	1											
MTBE	200					0.7						
Methyl ethyl keton (2-Butanone)	170	12.8			1.6					1.5		
Tetrahydrofuran	not established	43.0	<0.5							<0.5		
1,1-dichloroethane	700			<0.5		<0.5	<0.5	<0.5	<0.5			
1,2-dichloroethane	0.38					<0.5						
Chlorobenzene	50	<0.5										
Toluene	1000	7.4										<0.5
Tetrachloroethene	0.7		<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5
cis-1,2-dichloroethene	70			<0.5			<0.5					
Trichloroethene	2.8			<0.5			<0.5	<0.5				
4-methyl-2-penanone	not established											<0.5 A)

A) tentative identification

Groundwater Sampling Results from Water Supply Wells

Volatile Organic Compounds (part of billion, ppb)

Compound	State Standard	Wiley Davis Road			Adamson Drive				South Fremont Dr.		North Fremont Dr.	Groometown Rd.		Shedegfield Lane		
		3924	3927	4002	4002	4004	4006	4008	4000	4001	3912	4117	4113	4000	4009	4011
Benzene	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MTBE	200	0	0	0	<0.5	<0.5	0	0	0	0	0	0	0	0	0	<0.5
Methyl ethyl keton (2-butanone)	170	0	0	0	0	4.9	0	0	0	0	0	0	0	0	0	0
Tetrahydrofuran	not established	0	0	0	0	17.2	0	0	0	0	0	0	0	0	0	0
1,1-dichloroethane	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<0.5
1,2-dichloroethane	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chlorobenzene	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Toluene	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetrachloroethene	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cis-1,2-dichloroethene	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
trichloroethene	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-methyl-2-penanone	not established	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Recommendations for Wiley-Davis Landfill Area(Follow-up)

1. Determine the source of the contamination in the three wells highlighted in the report by sampling directly from the well itself as opposed to the house taps. This will require that two (2) of the well heads be brought above ground. If no lead found in the samples for wells 3 and 7 after sampling directly from the wells themselves, then this may suggest that lead is being leached from house plumbing. Run the water at well 10 for at least 15-20 minutes before sampling to try and determine if tetrahydrafuran levels are attributable to the glue used to adhere the pump to the pvc piping supplying the house.

2. Resample those wells identified for resampling by Dr. Ken Rudo.

3. Resample all wells previously sampled for pesticides, VOC's, and Inorganics to include barium, cadmium, chromium and nickel. With help from the State of NC. Also have state study groundwater flow in the area.

4. Recommend that residents petition the City of Greensboro for municipal water.

5. Wait on report currently being generated by the State before proceeding any further.

6. The above are possible ways of further investigating the groundwater in this area to provide residence with all information possible.